

11. (amended) A process according to claim 10, wherein said anion exchanger is a liquid anion exchanger.

12. (amended) A process according to claim 10, wherein said anion exchanger is a solid anion exchanger.

13. (amended) A process according to claim 10, wherein said anion exchanger, in its free base form has an apparent basicity corresponding to pKa of not higher than 6.

14. (amended) A process according to claim 10, wherein said anion exchanger, in its free base form has an apparent basicity corresponding to pKa of not higher than 4.5.

REMARKS

The Official Action of April 9, 2002 has been carefully considered and reconsideration of the application as amended is respectfully requested.

The dependency of claims 11-14 has been corrected to depend from claim 10 rather than from claim 1 so as to provide proper antecedent basis in these claims for the recitation "said anion exchanger". Claim 1 recites a cation exchanger only. An anion exchanger is first recited in claim 10.

Claims 1-36 stand rejected under 35 USC 103(a) as allegedly being

unpatentable over Voelskow et al in view of Hammond and Walkup et al for reasons of record in paper no. 9. However, the cited references, even if they were properly combinable in the manner set forth by the Examiner in paper no. 9, would not set forth even a *prima facie* case of obviousness because, as next discussed, the references do not teach or suggest all of the claim limitations as would be necessary for a *prima facie* obviousness rejection (see MPEP Section 706.02(j)).

In the invention as claimed, a lactate salt containing solution is contacted with a **cation exchanger** in its acid form so that ion exchange is effected with protons from the cation exchanger being transferred into the aqueous solution where they bind with the lactate anions to form lactic acid in solution. At the same time, the cations of the lactate salt transfer to the cationic exchanger and transform it into its salt form (claim 1, step a). Then, the resultant cations carrying exchanger (salt form) is converted at least partially into its acid form with formation of a basic product comprising the cation of the lactate salt (claim 1, step b). The claim requires that the same cation exchanger be used for acidulation of the lactic acid and, upon regeneration, for formation of the basic product comprising the cation of the lactate salt.

The Examiner has cited the primary reference, Voelskow et al, as allegedly showing the step of subjecting an aqueous solution containing a lactate salt to a cation exchanger (see step b on page 3 of paper no.9 and the last paragraph on page 4 of paper no. 9: "it would have been obvious for the skillful artisan to have used Hammond's anion exchanger followed by Voelskow et al's cation exchanger, along

with Walkup et al's hydrolysis and distillation in order to increase the efficiency of the overall process"). Applicant respectfully submits that Voelskow et al can not show or suggest the claimed step because Voelskow et al describe only a step of subjecting an aqueous solution containing a lactate salt to **an anion exchanger** to adsorb lactic acid (see Voelskow et al at column 5, lines 29-31). This is in contrast to the claimed step wherein a cation exchanger adsorbs cations from the lactate salt and transfers protons to the aqueous solution to acidulate it. In other words, the reference does not show or suggest subjecting a lactate salt to a cation exchanger which (a) transfers protons from the cation exchanger to the aqueous solution to acidulate it and thereby to form lactic acid in the solution, and (b) adsorbs cations from the aqueous solution onto the cation exchanger. Accordingly, even assuming for the sake of argument that the references cited by the Examiner were properly combinable in the manner urged by the Examiner, the combination would not arrive at the claimed invention for this reason alone.

The combination would also not arrive at the claimed invention because, as discussed above, claim 1 requires that the cations carrying cation exchanger be regenerated with conversion into a cation exchanger which is at least partially in its acid form and with formation of a basic product comprising the cation of the salt. As noted above, the primary reference does not show or suggest the use of a cation exchanger. The Hammond reference neither teaches nor suggests the use of a cation exchanger which is regenerated by reacting a cations carrying cation exchanger (salt form) to convert it into a cation exchanger which is at least partially in its acid form

and to a basic product comprising the cation of the lactate salt. (Hammond discusses both passing a feed solution through a column of an anion exchanger regenerated with alkali metal hydroxide and mentions inter alia that, if acid were desired in the end product, the alkali metal salt solution may be passed through a column of a cation exchanger in hydrogen ion form to yield an acid.) Accordingly, the cited combination of references does not show this step of the claimed invention either.

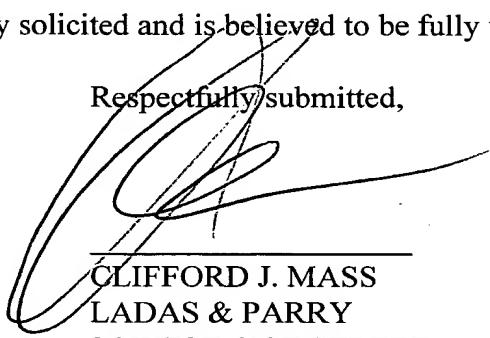
The Walkup et al reference cannot be used to supplement the deficiencies in the other two (2) references. On page 4 of the office action the examiner describes his understanding of the teaching of Walkup et al as follows: "Furthermore purified lactic acid can be produced from CO₂ catalysis of ammonium lactate and alcohol solution in the presence of an acid ion exchange resin at a temperature in the range of 100°C to 150°C." However, this characterization is, respectfully, not accurate. An accurate characterization would read as follows: "Furthermore purified lactic acid **ester** can be produced from CO₂ catalysis of ammonium lactate and alcohol solution. **This purified ester can then be hydrolyzed** in the presence of an acid ion exchange resin at a temperature in the range of 100°C to 150°C", **to form lactic acid and alcohol.** Furthermore, it is to be noted that the cation exchanger described by Walkup is used as a catalyst and has no ion exchange role in the process described. In addition, the hydrolysis described by Walkup is of the ester forming an alcohol and an acid while as stated e.g., in claim 24 of the application according to the present invention 'said decomposition of said cation exchanger salt is by hydrolysis to form the cation exchanger in its at least partially acid form and the second product is a base

of the cation forming the salt' and not of the cation exchanger. Thus in the present invention hydrolysis results in a cation exchanger in at least partially acid form and a base and not in the formation of an acid and an alcohol.

In view of the above, it is clear that the cited references, even if they were properly combinable, do not show or suggest all of the claim limitations such that they are incompetent to set forth even a *prima facie* case of alleged obviousness. Moreover, as discussed in detail in Applicant's Amendment filed 28 December 2001, the claimed process solves a longstanding problem in the art by providing that the same cation exchanger used for efficient acidulation of lactate acid be regenerated with formation of a base product of regeneration that is a strong enough base to be used as a neutralized agent in fermentation. The claimed process can thus be practiced with no stoichiometric consumption of base or acid and no production of by-product salts. This advantage of the claimed process could not have been foreseen or expected from the cited references, which show the consumption of acid and base in greater than stoichiometric amounts to achieve the effects described therein. Accordingly, even assuming for the sake of argument that the references individually showed the features of the claimed process, there would be nothing to suggest combining them in a manner that would result in the use of the same cation exchanger for acidulation of the lactic acid, upon regeneration, for formation of the base product with the beneficial effects described. Rather, the combination suggested by the Examiner results in a hybrid process with a greater number of ion exchangers and without the possibility of achieving the beneficial effects.

For the above reasons, the rejections of record are believed to have been successfully traversed and the application is believed to be in allowable form. An early notice of allowability is earnestly solicited and is believed to be fully warranted.

Respectfully submitted,



CLIFFORD J. MASS
LADAS & PARRY
26 WEST 61ST STREET
NEW YORK, NEW YORK 10023
REG. NO.30,086(212)708-1890

MARKED UP COPY

IN THE CLAIMS:

11. (amended) A process according to claim [1] 10, wherein said anion exchanger is a liquid anion exchanger.

12. (amended) A process according to claim [1] 10, wherein said anion exchanger is a solid anion exchanger.

13. (amended) A process according to claim [1] 10, wherein said anion exchanger, in its free base form has an apparent basicity corresponding to pKa of not higher than 6.

14. (amended) A process according to claim [1] 10, wherein said anion exchanger, in its free base form has an apparent basicity corresponding to pKa of not higher than 4.5.